TABLE OF CONTENTS

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EXECUTIVE SUMMARY

Last year the Federal Communications Commission ("*FCC*") issued two orders in its long pending effort to address the ongoing and growing problem of interference to public safety operations in the 800 MHz Private Land Mobile Radio Band ("*PLMRB*" or "*Band*") from Nextel Communications, Inc. and its affiliates ("*Nextel*") and to some extent from cellular operations in the upper portion of the *Band* ("*FCC Orders*"). The plan adopted in the *FCC Orders* involves relocating some of the frequencies used for public safety, business industrial and land transportation ("*B/ILT*") and commercial Specialized Mobile Radio ("*SMR*") operations in the band. The FCC issued SMR licenses through two methods: (1) site-specific licenses, and (2) BEA based auctioned spectrum

The Consensus Parties proposal, which was the basis for the *FCC Orders* and the *Orders* themselves, were based primarily on the assumption that *Nextel* owned or controlled most, if not all, of the 800 MHz SMR spectrum in every Basic Economic Area ("*BEA*") market or City. What the plan failed to take into consideration is that in many markets site-specific and *BEA* licenses occupy the same channels. Therefore, Nextel's relinquishment of a channel still can leave incumbent site-specific channels to remain which can preclude other site-specific licensees from occupying a channel without being at a sufficient distance separation to mitigate co-channel interference.

Concepts To Operations, Inc. ("*CTO*") has examined the impact of the *FCC Orders* when applied to specific markets and Cities using official license data obtained from the *FCC* database. The purpose of the analysis was to provide the following:

1. An engineering analysis of the impact of the plan adopted by the *FCC Orders*. To our knowledge no such analysis was performed by *Nextel* or the *FCC* and was made available for public comments considering the magnitude of the undertaking.

2. Confirmation that the following results claimed in the *FCC Orders* are valid:

   A. There is sufficient spectrum to accommodate every licensee affected by the relocation.
   B. Each such licensee can be provided "comparable facilities" including "coextensive geographical coverage".
   C. There is sufficient spectrum available after implementing the plan to support public safety receiving an average of an additional 2.5 MHz of 800 MHz spectrum.
   D. Day-to-day public safety operations, including regional interoperability, will not be disrupted due to rebanding.

The report is based on license data obtained directly from the *FCC* database as of June 30, 2005. These data were the best currently available to *CTO*. Using the relocation rules set forth in the *FCC Orders*, *CTO* reviewed the implication of rebanding in 578 Cities in the U.S. and its territories with a population of 50,000 or greater ("*Cities*" or, individually, "*City*").

The methodology used for calculating spectrum surplus or deficit, considering co-channel geographic distance, measured in terms of available 800 MHz *Band* channels, in each *City* examined was as follows.

CTO determined the number of:

- Non-*Nextel* and non-Southern LINC ("*Southern*") site-specific channels within channels 001-120 and 401-600 that would be relocated to channels 121-400 within (a) thirty-five (35), (b) fifty (50), and (c) seventy (70) mile radius of each *City* center; and
- Non-*Nextel* site-specific channels that would remain within channels 121-400 within the three radii set forth above from the *City* centers.

Then *CTO* calculated the channel movement, based again on the *FCC Orders*, to determine Channel surplus or deficit. This was measured in each *City* using the following method;

A. Consider channels 001-120 and the National Public Safety Planning Advisory Committee ("*NPSPAC*") channels (channels 601-720) exchange a wash numerically;
B. Calculate the number of incumbent licensed channels in channels 121-400, that remain in place after *Nextel* and *Southern* vacate this spectrum;
C. Calculate the number of additional licensed channels that are to relocate into channels 121-400 from channels 001-120 and 401-600;
D. Add Categories B and C to obtain the total number of channels that require accommodation; and
E. Subtract the resulting number from 280 (the maximum number of channels that are within channels 121-400) to obtain the number of surplus or deficit channels after *Nextel* and *Southern* vacate.

This channel calculation was conducted on 578 Cities in the U.S. and its territories and the resulting analysis supports the following conclusions:

A. Nextel lacks sufficient channels within channels 121-400 to accommodate every non-*Nextel* site-based licensee affected by the relocation. In addition in the *ESMR* block there is insufficient spectrum to accommodate all *BEA* licensees,
B. Contrary to claims, the *Rebanding Order*s do not provide each licensee with "comparable facilities" including "coextensive geographical coverage",
C. There is not sufficient spectrum available after rebanding to support public safety receiving an additional 2.5 MHz of 800 MHz spectrum in every *City*. In fact in 11 of the largest 100 *Cities* public safety actually could lose spectrum, and
D. Day-to-day public safety operations, including regional interoperability, cannot be maintained unless simultaneous frequency reconfiguration of involved public safety agencies occurs.

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Using a 35-mile radius from the center of the 578 Cities, the 280 channels within channels 121-400 are insufficient to accommodate the reconfiguration of site-specific channels in some one of these Cities. For example:

Boston, MA: There are 206 incumbent channels licensed in channels 121-400 that will remain in place post rebanding. In addition, 193 licensed channels will be required to relocate into channels 121-400. The 206 incumbent channels added to 193 relocating channels equals 399 channels. The 280 channels available in channels 121-400, minus 399, equal a deficit of 119 channels that cannot meet the 70-mile requirement for co-channel separation. This means 119 channels owned by various licensees cannot be accommodated in Boston, Furthermore, many of these channels are licensed to public safety agencies (e.g., police, fire, EMS). In addition, Cities near to Boston that are in Massachusetts, Rhode Island and New Hampshire will also have a spectrum shortage of between 35% and nearly 50% of the spectrum allocated for relocation of high-site licensees by the FCC.

Miami, FL: There are 227 incumbent channels licensed in channels 121-400 who will remain in place post rebanding. In addition, 159 licensed channels will be required to relocate into channels 121-400. The 227 incumbent channels added to 159 relocating channels equals 386 channels. The 280 channels available in channels 121-400, minus 386, equal a deficit of 106 channels that cannot meet the 70-mile requirement for co-channel separation. This means 106 channels licensed to various entities cannot be accommodated in Miami. Again many of these channels are licensed to public safety agencies. A similar overall shortage would also occur in Cities near Miami.

In 24 of the 100 largest U.S. Cities there is not sufficient spectrum being vacated by *Nextel* and *Southern* to allow public safety the additional 2.5 MHz of 800 MHz and in 11 of those cities, public safety could actually loose spectrum.

Under the rebanding plan, the upper portion of the band (channels 441 and above) is to be used by "cellular-like" low-site Enhanced Specialized Mobile Radio ("*ESMR*") systems. The *CTO* analysis found that the 280 channels set aside (not including the 40 channel Guard Band channels 401-440) cannot accommodate the 430 BEA channels purchased in the spectrum auctions. This does not allow for "comparable facilities" to be granted to non-Nextel and non-Southern licensees in many *BEA*s. The problem is further exacerbated when the former *NPSPAC* channels (channels 601-720) and 10 MHz of the 1.9 GHz are exclusively reserved for *Nextel*.

Based on the conclusions the following recommendations are presented to accomplish rebanding.

With respect to the high-site portion of the band:

A. The frequency boundary between the non-Cellular Block and ESMR portions of the revamped 800 MHz band should be flexible and allow for accommodation of all existing site-specific licensees. The Commission should amend the plan adopted in the *Rebanding Orders* to require coordination for the licensed channels to be relocated to

ensure that co-channel interference will not be a problem after band reconfiguration. The Commission, therefore, should grant APCO International, Inc.'s Petition for Partial Reconsideration.

B. To provide "comparable facilities" including "coextensive geographic coverage" a system-by-system examination, comparing present and reconfigured systems, must be made. The additional channels obtained by the flexible boundaries should allow for provision of "comparable facilities".
C. Based on the above recommendations, although solving the spectrum shortage for the 11 Cities on the top 100, an additional 2.5 MHz can only be obtained by further moving the boundary into the present *ESMR* portion of the band.
D. Frequency reconfiguration of agencies requiring regional interoperability should occur simultaneously.

With regard to the ESMR portion of the band:

A. Where the boundaries became flexible to accommodate site-specific licensees, granting of channels 601-720 exclusively to *Nextel* should not occur,
B. The non-*Nextel* non-*Southern BEA* licenses should be allowed to be accommodated above the revised lower frequency boundary in the entire ESMR portion of the band (including channels 601-720) and in the 1.9 GHz band as necessary to provide "comparable facilities" and "coextensive geographic coverage".

The results of the *CTO* analysis for each City and the *BEA*s examined are reflected in the Detailed Analysis which follows.

DETAILED ANALYSIS

Concepts To Operations, Inc. is a telecommunications and information systems engineering and consulting firm that has been in business since 1990 and *CTO*'s qualifications are a matter of record with the *FCC* and NTIA. *CTO*'s engineers have had experience ranging from 11 to 54 years. *CTO*'s engineering expertise includes both Federal Government and non-Federal radio spectrum management and radio engineering, particularly land mobile radio, both commercial and public safety. *CTO* engineers have served as members of FCC Advisory Committees. *CTO* has participated in and is on record in many FCC filings and proceedings and has been active in APCO and NENA activities and initiatives. In addition, from the beginning *CTO*, on behalf of its public safety as well as commercial clients, has actively participated and has provided advice and analyses concerning the FCC's reconfiguration of the 800 MHz band ("*Rebanding Proceeding*"), including input and data to be used in various filings in this proceeding. This advice and analysis has included an assessment of the requirements and impact of the two FCC orders adopting a specific reconfiguration process for the 800 MHz Band.[1] *CTO* provided a Rebanding Cost Analysis which concluded that the real cost associated with rebanding is approximately $3.5 Billion rather than under $1.0 Billon. The *FCC* ultimately required Nextel to place a $2.8 Billion letter of credit.

In November of 2004, *CTO* prepared an analysis of the relocation of public safety, non-Nextel SMR and B/ILT licenses in portions of the 800 MHz band (specifically Channels 001-150 and 401-600) under the Commission's *Initial Report and Order*. That analysis raised serious questions about the sufficiency of available spectrum to accommodate certain public safety, SMR and B/ILT licensees that were required, under the terms of the *Initial Report and Order*, to be relocated to Channels 151-400 as part of the rebanding process. To CTO's knowledge, the concerns reflected in that report remain unrefuted.

CTO has conducted a further, extensive two part review of the impact of the *Rebanding Orders* on relocation of commercial and public safety licensees.[2]

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1 *In the Matter of Improving Public Safety Communications in the 800 MHz Band, Report and Order, Fifth Report and Order, Fourth Memorandum Opinion and Order, and Order,* 19 FCC Rcd. 14969 (2004), as amended by *Erratum,* released September 10, 2004, *Erratum,* DA 04-3208, 19 FCC Rcd. 19651 and *Erratum,* DA 04-3459, released October 29, 2004, *recon. and appeal pending ("Initial Report and Order"); Supplemental Order and Order On Reconsideration,* 19 FCC Rcd. 25120 (2004), *recon. and appeal pending ("Supplemental Order")* (collectively, "*Rebanding Orders*").

2 In this analysis CTO has used the existing numbers for channels 001-600 and have used and numbered 25 kHz channels above 600. These channel numbers are continued in the rebanded spectrum rather than the new FCC channel numbers for clarity.

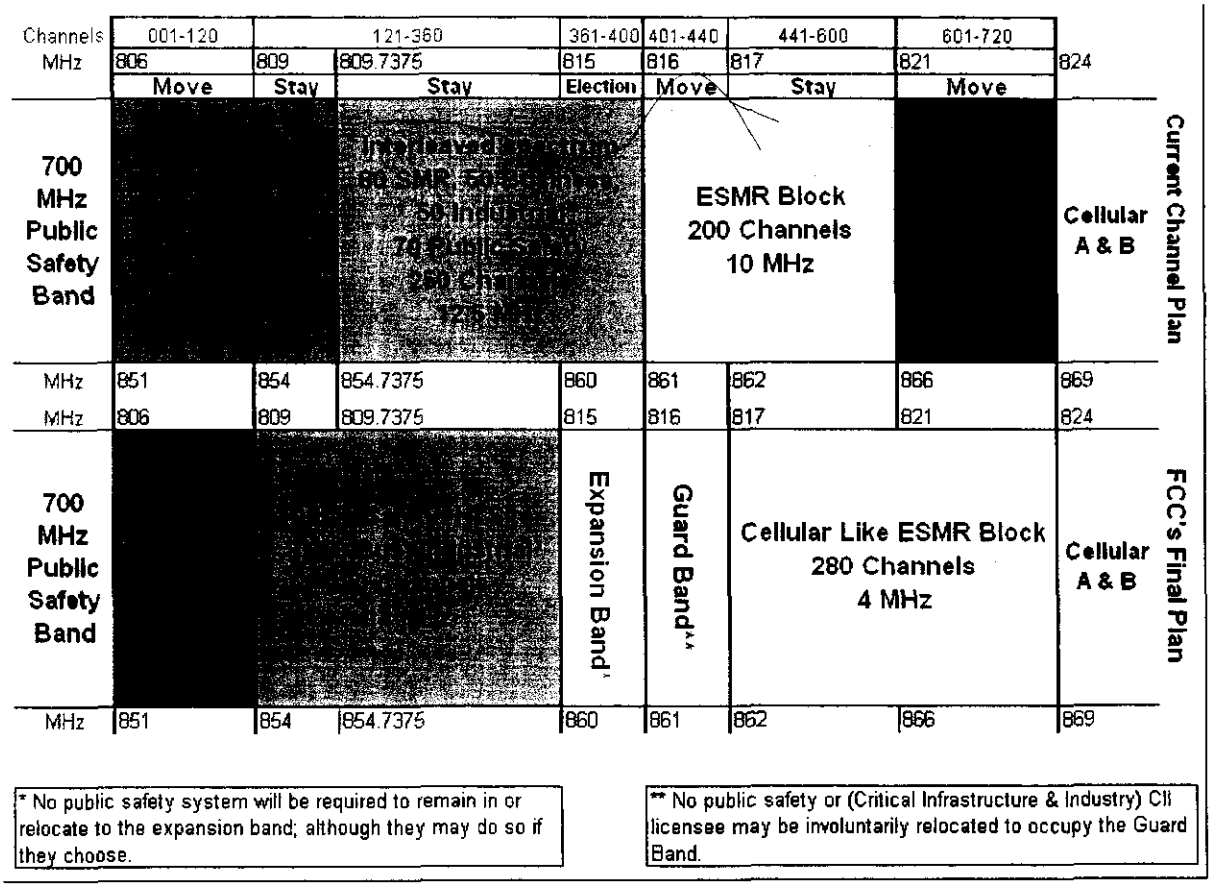
METHODOLOGY

In developing this Report, CTO downloaded the FCC's Public Land Mobile Radio Band ("PLMRB") database as of June 30, 2005.

CTO initially determined the identity and location of the five hundred seventy-eight (578) Cities in the U.S. and its territories with a population of 50,000 or greater. CTO then determined the number of:

1. Non-Nextel and non-Southern site-specific channels within channels 001-120 and 401-600 that would be relocated (see **Figure 1** for 800 MHz Band Relocation Plan) to channels 121-400 within (a) thirty-five (35), (b) fifty (50), and (c) seventy (70) mile radius of each of the City centers; and
2. Non-Nextel site-specific channels that would remain within channels 121-400 within the three radii set forth above from the City centers.

FIGURE 1



The FCC's rules require co-channel coordination of site-specific licenses whose base stations are within 70 miles of each other. We therefore initially determined which licenses would remain or be relocated within a 35-mile radius of each City center. Any license within this radius from a particular City's center generally would preclude use of such frequency within 70 miles of the first licensee's channel. Thus, a 70-mile radius circle with its center at any given point:

1. on the circumference of; or
2. within the thirty-five (35) mile radius circle from a particular City's center encompasses the entire thirty-five (35) mile radius circle and precludes the use of the co-channel within that circle.

Further, location of a base station at a 70 miles distance from the center of a City will require coordination with existing stations that are at or within a 70 mile radius of the City center. Thus the 50 and 70 mile radii circle used provide an indication of additional channels for which coordination is required. This is illustrated in **Figures 2, 3** and **4**.

FIGURE 2 shows the required 70-mile coordination distance for a co-channel at a site on the circumference of 35-mile radius circle centered at the center of a City. The 70-mile radius circle encompasses the entire 35-mile radius circle which shows that coordination is required for any site located within the 35-mile circle.

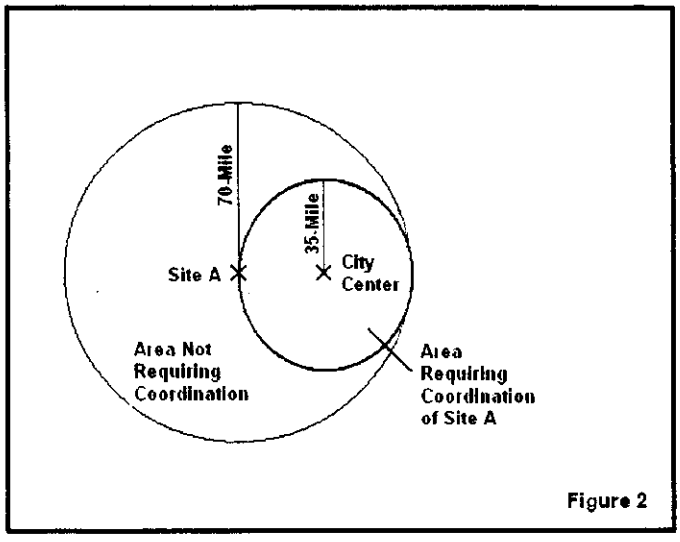


Figure 2

FIGURE 3 shows the 70-mile coordination distance with a site located on the circumference of 50-mile radius circle centered at the center of a City. Only a portion of the 50-mile circle requires coordination.

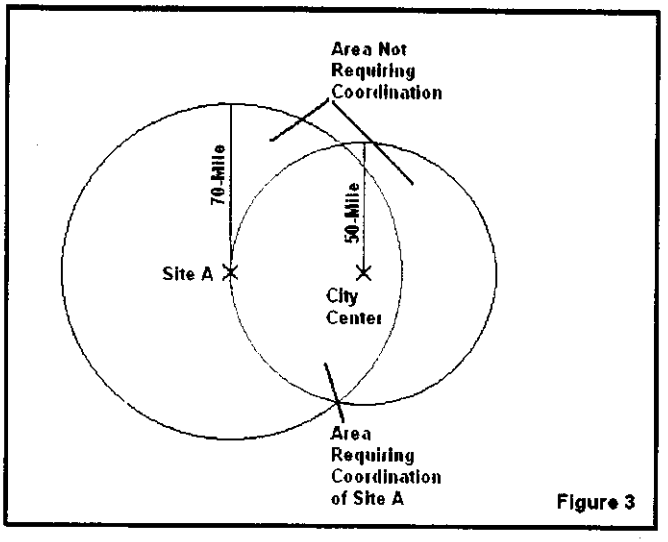
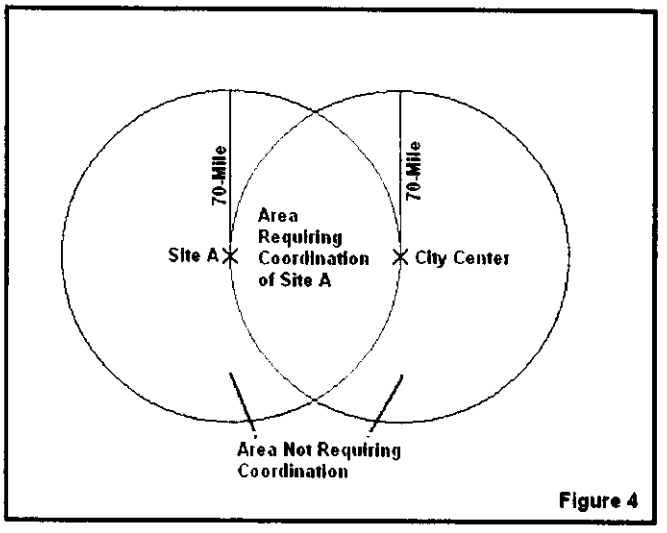


FIGURE 4 shows the 70-mile coordination distance with a site located on the circumference of a site at a 70 mile radius circle centered at City center. Coordination is required for an even smaller portion of this circle.



CTO then determined whether the vacated Nextel BEA and site licensed channels and the vacant channels in channels 121-400 within the three radii set forth above from a particular City center are sufficient for the *Rebanding Orders* to provide the relocated public safety and non-Nextel and non-Southern site-specific SMR, B/ILT licensees with "comparable facilities".

CTO then performed a similar analysis for the ESMR portion of the band, channels 400-720, based on BEAs.

First, CTO examined the required high-site relocations, considering site specific license channels that are to remain in or be relocated to frequencies between 806/851 and 816/861 MHz (channels 001 to 400) within several circles of different radii from the center of the Cities. The purpose of the analysis is to determine if there are a sufficient number of channels in this portion of the 800 MHz band to accommodate and provide "comparable facilities" to these licensees. This portion of the band has 400 channels including a 40 channel "Expansion Band" (channels 361-400) in the upper portion.

Second, CTO examined the upper portion of the 800 MHz band between 816/861 and 824/869 MHz (channels 401 to 720) that is to be used for ESMR systems. This portion of the band contains 320 channels including a 40 channel "Guard Band" (channels 401-440). This portion of the analysis was done on a BEA basis rather than a City basis because this conforms to the manner in which licenses were auctioned by the FCC.

1. Spectrum Availability For Relocation Of Certain Public Safety, SMR and B/ILT Licensees To Comparable Facilities

CTO initially investigated the availability of spectrum in the 806/851 to 816/861 MHz band (channels 001–400), which is to support and provide "comparable facilities" to public safety, SMR, and B/ILT licensees after rebanding occurs. This portion of the 800 MHz band, which contains 400 duplex channels, must accommodate present non-Nextel and non-Southern users, such users from channels 001–120, and such users holding site-specific channels in channels 401–600. Nextel and Southern are to relocate from channels 001–400 to make spectrum available to those present and relocated channels. Nextel and Southern also must vacate channels 401–440 (the Guard Band). The public safety licensees presently in the NPSPAC portion of the band (821/866–824/869 MHz) (channels 601-720) are to relocate to 806/851–809/834 MHz (channels 001-120) the 120 channels vacated by other licensees.

The FCC requires co-channel coordination of licensees whose base stations are within 70 miles of each other. This first part of our analysis initially used a circle of a 35-mile radius around each City, which was examined to determine which channels would remain or be relocated in this circle. Any of these located within the 35-mile radius circle generally would preclude the use of a co-channel licensee's frequency within 70 miles of the first licensee's channel. Thus a 70-mile radius circle with its center at any given point on the circumference of or within the 35-mile radius circle would encompass the entire 35-mile radius circle and preclude the use of the channel unless an engineering study can show that co-channel interference will not occur, because of terrain shielding, use of directional antennas and/or reduced power.

TABLE 1 shows (for selected Cities) the City and state examined, the non-Nextel/non-Southern site-specific incumbents licensed for channels 121–400 within 35 miles of the City center and those non-Nextel/non-Southern site-specific channels licensed on channels 001–120, and channels 401–600. There are 280 channels within channels 121–400.

If the site-specific channels presently within channels 121–400 and those to be relocated to channels 121–400 exceed 280 then a spectrum or channel deficit exists and some of the site-specific channels cannot be accommodated in the 280 channels between channels 121–400. The following sample reflects the significant channel deficits found in BEA's 3 (including Boston), 31 (including Miami), and 174 (including major Cities in Puerto Rico).

For example, Boston, MA, the largest City in BEA 3, has 206 site-specific non-Nextel/non-Southern incumbent channels within a 35-mile radius of the City center. In addition, 73 non-Nextel/non-Southern site-specific incumbent channels relocating from channels 001–120, and 120 channels relocating from channels 401–600 are to be accommodated. The total requirement is 399 channels, but since there are only 280 channels, 119 incumbent site-specific licensed channels cannot be accommodated, which is the deficit as shown. Similarly, for Miami, FL the largest City in BEA 31, a deficit of 106 channels exists.

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TABLE 1: SELECTED CITIES WITH CHANNEL DEFICIT

City Name	BEA #	Non-Nextel/Non-Southern Site-Specific Incumbent Channels within	Non-Nextel/Non-Southern Site-Specific Channels to Move-in within		Site-Specific Channel Deficit within
		35-mile radius *	35-mile radius *		35-mile radius *
		Chan 121-400	Chan 001-120	Chan 401-600	Chan 121-400
Pawtucket, RI	3	213	83	123	(139)
Taunton, MA	3	208	83	123	(134)
Brockton, MA	3	212	80	120	(132)
Quincy, MA	3	212	78	120	(130)
Providence, RI	3	207	77	123	(127)
Newton, MA	3	211	74	120	(125)
Lowell, MA	3	210	71	120	(121)
Boston, MA	3	206	73	120	(119)
Cambridge, MA	3	203	73	120	(116)
Waltham, MA	3	205	71	120	(116)
Cranston, RI	3	197	75	123	(115)
Lawrence, MA	3	202	67	124	(113)
Malden, MA	3	200	72	120	(112)
Medford, MA	3	200	72	120	(112)
Somerville, MA	3	198	71	120	(109)
Haverhill, MA	3	196	67	124	(107)
Nashua, NH	3	195	68	119	(102)
Lynn, MA	3	192	68	120	(100)
Fall River, MA	3	178	78	123	(99)
Warwick, RI	3	165	72	123	(80)
New Bedford, MA	3	145	62	123	(50)
Manchester, NH	3	132	51	119	(22)
Hollywood, FL	31	232	85	79	(116)
Pembroke Pines, FL	31	232	85	79	(116)
Miramar, FL	31	232	84	79	(115)
Hialeah, FL	31	227	83	79	(109)
North Miami, FL	31	227	83	79	(109)
Miami Beach, FL	31	227	81	79	(107)
Miami, FL	31	227	80	79	(106)
Coral Springs, FL	31	181	90	10	(1)
Margate, FL	31	181	90	10	(1)
Pompano Beach, FL	31	181	90	10	(1)
Bayamon, PR	174	176	57	134	(87)
Guaynabo, PR	174	176	56	134	(86)
Caguas, PR	174	173	56	134	(83)
San Juan, PR	174	173	56	134	(83)
Carolina, PR	174	154	56	114	(44)
Ponce, PR	174	148	62	99	(29)

* From center of City.

As another example one non-Nextel/non-Southern licensee holds both the BEA authorizations (125 channels), which were acquired during FCC auction No. 34, and site-specific channel licenses in the Puerto Rico BEA market. Using the methods described above, **TABLE 1** shows that for six (6) Cities in Puerto Rico (BEA 174) a deficit ranging from 29 to 87 channels exists for site-specific licenses. The conclusion is that this licensee's channels cannot be accommodated in the Puerto Rico BEA because the relocations, due to rebanding, cannot even accommodate the existing non-Nextel/non-Southern site-specific licensed channels, let alone these 125 BEA licensed channels.

In the cases of Boston, Miami and Puerto Rico, much of the 35-mile radius circle covers water, where licensed channels will not be located. Thus, the density of licensed channels will be increased in the land areas. In such cases only a portion of the 35-mile radius will contain the licensed site-specific channels and the 70-mile distance required for interference protection would only need to cover land areas rather than the 35-mile radius around the Cities centers. This, in effect, means that the center of a 70-mile radius circle can be further away from the center of the City to preclude the use of a channel or can preclude use in a portion of the area surrounding the City center.

In order to account for this deficit, determinations were made for 50-mile and 70-mile radius circles. These are shown along with the 35-mile circle deficit (see Figures 1, 2, and 3). The data are shown in **TABLE 2** as an exhibit for all Cities with a population of 50,000 or more within all BEA's. These data are current as of June 30, 2005. Regarding elections in BEA's, for example, only one (1) licensee in BEA 003 (Boston, Worcester, Lawrence, Lowell, and Brockton) elected to move ten (10) channels from the Interleaved Band (channels 121-360) to the Guard Band (channels 401-440). This would only reduce the site-specific deficit by ten (10) channels, leaving deficits ranging from 12 to 129 channels for various Cities in the BEA within channels 121-400. Several other BEA licensees have elected to move to the Guard Band involving BEA's 113, 114, 092, and 002. In these BEA's there is no site-specific channel deficit even before the requested election. One (1) site-specific licensee has also elected to move to the Guard Band.

In addition to the incumbents, any non-Nextel BEA license that does not qualify as an ESMR would also need to be accommodated in channels 121-400, which may reduce the channel surplus in many of the Cities. In cases with only a small surplus this may result in a channel deficit. In cases where a deficit has been found; the deficit could increase due to inclusion of non-ESMR BEA licenses.

Considering Miami and the surrounding Cities, one BEA license of five (5) channels exists but cannot meet the ESMR criteria specified in the Orders.[3] Thus it must be relocated in channels 121-400 and might raise the deficit by five (5) channels. For Miami the deficit may rise from 106 to 111 channels.

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3 In the Initial Report and Order, the Commission defines cellular like systems as "a system having more than five overlapping interactive sites featuring hand-off capability; and any one of such sites has an antenna height of less than 100 feet above ground level with an antenna height above average terrain (HAAT) of less than 500 feet and more than twenty paired frequencies." Id., at ¶ 172.

Note that the Cities within the Southern area and the areas bordering Canada and Mexico have been treated in the same manner as used in the rest of the areas analyzed. These areas require different relocation considerations, which were not included in the analysis. The analysis also did not take into account the differences because of the use of narrow channel spacing in California.

Furthermore, rebanding is intended to separate the low-site ESMR portion of the band from the high-site (non-ESMR) portion in order to reduce adjacent channel and intermodulation interference to public safety. However, the relocation and retention of high-site SMR and B/ILT licensees in channels 001–400 can also produce unacceptable adjacent channel and intermodulation interference to public safety systems operating in that portion of the 800 MHz band.

Although some transmissions are of short duration, those systems that are trunked have continuous transmissions on the control channel. Also, systems for mobile data operations are transmitting most of the time. Both types of signals can cause unacceptable adjacent channel interference and can also, in combination with other transmissions, cause unacceptable intermodulation interference.

Attention must be paid to the frequency assignment of all relocated systems to ensure that interference is minimized particularly in high density environments. Additional filters and other interference suppression equipment can also be necessary. These are costs which Nextel has no obligation to reimburse to those licensees being relocated or remaining.

Interoperability has been cited as a requirement for public safety communications. A sufficient number of channels must be made available to be used for interoperability whether it involves communications between agencies within a jurisdiction or between agencies of different jurisdictions. The events of 9/11, the recent hurricanes in Louisiana, Mississippi and Texas and the forest fires in California underscore the need for interoperable communications.

The Orders point to retuning and reprogramming mobile and portable equipment as part of the reconfiguration process. If this does not occur simultaneously for all public safety systems which require communication during emergencies, interoperability can not occur. If an emergency occurs during the reconfiguration process the consequences of not having full interoperability can cost lifes. Thus, public safety systems of cooperating jurisdictions must be reconfigured simultaneously.

This situation can be even more serious when cooperating agencies are in different reconfiguration waves.

The Transition Administrator ("TA") has stated that they will provide a Frequency Proposal Report ("FPR") containing new frequencies proposed for each reconfiguring frequency. The TA states that these "...will have no co-channel licensees and locations that are not in compliance with FCC short-spacing rules..." The short-spacing rules require a minimum separation of 55 miles if reduced antenna height above average terrain and lower than maximum authorized effective radiated power of the short-spaced station is used. Where deficits or small surpluses in channels 121-400

(see Table 2) have been found, it is extremely unlikely that the coverage area of relocating channels can be retained to provide comparable "coextensive geographic coverage".

Based on the short-spacing 55-mile coordination requirement on examination was made of Boston and Miami assuming that all licensees use lower power and/or antenna height that allow for short spacing.

For Boston within 27.5 miles of the center of the City there are 182 incumbent channels within channels 121 to 400. These and the incumbent 63 channels in channels 001 to 120 and the 120 incumbent channels in channels 401 to 600 that would both relocate to channels 121 to 400 leaves a deficit of 85 channels.

For Miami there are 222 incumbent channels in channel121-400 within 27.5 miles of the center of the City. This plus 77 incumbents in channels 001 to 120 and 79 incumbents in channels 401 to 600 that would relocate to channels 121 to 400 results in a deficit of 98 channels.

Thus, even if all incumbents were short-spaced in either of these Cities a channel deficit would exist after rebanding occurs.

It has been stated that rebanding will provide additional spectrum to Public Safety. "...Nextel states that through its relinquishment of 800 MHz General Category and interleaved spectrum, it is giving up an average of 8.5 megahertz of bandwidth, resulting in an average net gain of 2.5 megahertz to public safety. Combined with the two megahertz of spectrum that Nextel is giving up from its spectrum holdings in the Upper 200 block, the average net amount of spectrum being relinquished by Nextel is 4.5 megahertz."[4]

TABLE-2 shows the deficit or surplus of channels which includes use of the Interleaved (channels 121-360) and Expansion (channels 361-400) Bands. This table includes non-Nextel incumbent channels that will remain in these Bands. These incumbent licensed channels preclude the use of the channels by others generally within a 35-mile radius of the Cities examined and in some cases within a 70-mile radius of the Cities.

Considering only the 35-mile radius case, 418 out of 578 or 72.3% of the Cities would be able to use all of the 2.5 MHz for public safety operations. The analysis did not take into account the Southern area and the Canadian and Mexican border areas difference in the relocation plans. However, the analysis does show that in many cities considerably less spectrum is available to public safety than the additional 2.5 MHz that was contemplated by the *Rebanding Orders*. Over twenty-five percent (25%) of the Cities would not have full use and some of these Cities would not have use of any of the 2.5 MHz of spectrum available for public safety use.

Using the 35-mile radius, CTO found that in the 100 largest Cities, in terms of population, 24 Cities cannot use the full 2.5 MHz because of incumbent licensees. Of these 24 Cities, 11 cannot have access to any of the 2.5 MHz vacated by Nextel because of non-Nextel incumbents remaining

4 See FCC 04-168, paragraph 307.

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in the area. As noted previously, Boston, MA, San Juan, PR, and Miami, FL have deficits of channels and can use none of the 2.5 MHz. But New York, NY can only use 2.4 MHz or 96% of the 2.5 MHz for public safety. Similarly, Memphis, TN can only use 1.1 MHz or 44% of the 2.5 MHz; Las Vegas, NV can only use 1.55 MHz or 62% while Minneapolis, MN, Anchorage, AK, and Greensboro, NC can use none of the 2.5 MHz for public safety.

Regarding the two (2) MHz from the holdings that Nextel is giving up in the Upper 200 Block, this forms the Guard Band (channels 401-440). If public safety were to use these channels they could be subject to the same type of interference problems that resulted in the interference mitigation steps taken in the *Initial Report and Order*.

Yet many of these large Cities have the greatest need for additional public safety spectrum.

2. Spectrum Availability For Relocation of BEA Licensees To Comparable Facilities

In the second part of its analysis CTO examined the relocation requirements specified by the FCC in the *Rebanding Orders* for BEA licenses obtained during the FCC's auctions. The ESMR licensed channels are to stay in or relocate to channels within the frequency range 817/862–824/869 MHz (channels 441–720). The present NPSPAC public safety channels in the range 821/866–824/869 MHz (channels 601–720) are to be vacated by public safety and relocated 15 MHz below present frequency assignments. This vacated portion of the band, containing 120 channels, is to be used by Nextel and/or Southern to relocate channels from below 817/862 MHz (channels 440 and below). In addition, 10 MHz of the 1.9 GHz band is to be made available to Nextel for use in its operations.

Simply put, 430 channels were purchased by BEA licensees in each of the 175 BEA markets during the FCC auctions and only 280 channels (not including the 40 channel Guard Band) are to be made available in the 800 MHz band to accommodate them. Nextel is given preference in rebanding, which allows them exclusive use of the top 120 channels (6 MHz) in the 800 MHz band and the full 10 MHz in the 1.9 GHz band. The remaining channels in the 800 MHz band available for non-Nextel and non-Southern licensees cannot accommodate these other licensees, with "comparable facilities" without use of the 1.9 GHz or some other frequencies by non-Nextel and non-Southern licensees.

If Nextel would vacate channels 441-600 to accommodate non-Nextel BEA licensees, all but BEA 174 could be accommodated in these 160 channels. BEA 174 has non-Nextel licensees having 265 channels. To accommodate these non-Nextel BEA licensees Nextel would have to provide additional spectrum by relinquishing some of the channels in the 601-720 channel range in the 800 MHz band and the remainder in a portion of the 1.9 GHz band. These would be used by non-Nextel BEA licensees in BEA 174.

However, there will be a deficit of site-specific channels for Cities in BEA 174 which will require Nextel to relinquish additional channels in the 800 MHz or 1.9 GHz band.

CONCLUSIONS

1. After a careful review of the data and examination of the concepts set forth in the Rebanding Orders, the approach to be taken for reconfiguring the 800 MHz band cannot be accomplished and provide "comparable facilities" to all licensees. Even if all incumbents were short-spaced a number of Cities will still suffer spectrum shortage.

2. In many of the 578 Cities examined the number of site-specific licensed channels to remain in channels 121-400 and those to be relocated to these channels exceed the 280 channels available and therefore cannot provide "comparable facilities" including required spectrum and "coextensive geographic coverage".

3. In 24 of the largest 100 U.S. Cities full access to the 2.5 MHz to be used by public safety after being vacated by Nextel is not possible and 11 of these Cities cannot have any access to these 2.5 MHz and have a deficit instead.

4. The two (2) MHz given up by Nextel in the Upper 200 Block is to form a Guard Band where interference can occur and therefore is not suitable for Public Safety operations.

5. Additional spectrum is needed to provide for public safety interoperability, particularly in larger Cities, to aid in coping with terrorist and natural disasters. For example Boston, MA, Miami, FL, and San Juan, PR can be vulnerable to natural disasters from hurricanes or storms in the Atlantic Ocean and have a shortage of public safety frequencies.

6. Coordination is required to ensure that co-channel interference will not be a problem in channels 121-400 after reconfiguration occurs.

7. Relocation of *BEA* licensees to the *ESMR* portion of the band, with Nextel having exclusive use of the upper six (6) MHz of the band, does not provide sufficient spectrum for the non-Nextel BEA licensees. Additional spectrum is therefore required to provide the *BEA* licensees, with "comparable facilities".

8. Exclusive use of the vacated *NPSPAC* channels provides Nextel with better-than "comparable facilities" because they will obtain a block of contiguous unencumbered channels.

9. Regional interoperability must be maintained during the reconfiguration. It is imperative that frequency reconfiguration of agencies requiring regional interoperability occur simultaneously even if the agencies are in different Waves.

10. Regional interoperability cannot be maintained unless simultaneous frequency reconfiguration of the involved agencies occurs.

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11. There is not sufficient spectrum to accommodate every licensee affected by the relocation. Therefore, contrary to claims, the Rebanding Orders do not provide each licensee with "comparable facilities" including "coextensive geographical coverage", and

12. There is not sufficient spectrum available after rebanding to support public safety receiving and additional 2.5 MHz of 800 MHz spectrum in every City.

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RECOMMENDATIONS

1. The frequency boundary between the non-Cellular Block and *ESMR* portions of the revamped 800 MHz band should be flexible and allow for accommodation of all existing site-specific licensees.

2. The exclusive use of the upper portion of the *ESMR* portion of the 800 MHz band should therefore not be granted to Nextel at the expense of other BEA licensees.

3. As an alternative, Nextel could vacate a sufficient number of channels in each *BEA* to accommodate non-*Nextel BEA* licensees in the 817/862–824/869 MHz band, or non-*Nextel BEA* licensees could be given equivalent spectrum in the 10 MHz of the 1.9 GHz band. In the case of BEA 174 access to the 1.9 GHz band should be granted to accommodate the *BEA* channels which can not be accommodated in the 800 MHz band.

4. Frequency reconfiguration of agencies requiring regional interoperability should occur simultaneously.

5. Reinstate frequency coordination to ensure that Public Safety, Business, Industrial and Land Transportation and *SMR* Site-Licensed Channels receive comparable facilities.

Table 2 - Channel Deficit or Surplus for All Cities Over 50,000 Population

City Name	State	BEA #	City Center		Non-Nextel Site-Specific Incumbents within			Non-Nextel Site-Specific Licensees Move-in within						Nextel Site-Specific Licensed Channels within			Site-Specific Channel Deficit or Surplus within Channels 121-400		
					35 mi radius *	50 mi radius *	70 mi radius *	35 mi radius *		50 mi radius *		70 mi radius *		35 mi radius *	50 mi radius *	70 mi radius *			
			Longitude	Latitude	Chan 121-400	Chan 121-400	Chan 121-400	Chan 001-120	Chan 401-600	Chan 001-120	Chan 401-600	Chan 001-120	Chan 401-600	Chan 121-400			35 mi radius *	50 mi radius *	70 mi radius *
Bangor	ME	1	-68.789	44.8297	34	39	60	5	21	12	22	15	22	103	135	164	220	207	183
Portland	ME	2	-70.2115	43.6663	115	141	178	32	134	58	138	63	140	178	226	227	(1)	(57)	(101)
Boston	MA	3	-70.9703	42.3143	206	220	243	73	120	81	120	115	124	138	173	186	(119)	(141)	(202)
Brockton	MA	3	-71.0275	42.0842	212	222	243	80	120	91	123	116	124	164	171	186	(132)	(156)	(203)
Cambridge	MA	3	-71.1122	42.3781	203	221	244	73	120	82	120	117	124	138	173	186	(116)	(143)	(205)
Cranston	RI	3	-71.4682	41.7687	197	223	229	75	123	91	123	94	123	141	147	180	(115)	(157)	(166)
Fall River	MA	3	-71.0707	41.6853	178	223	243	78	123	88	123	117	123	139	171	183	(99)	(154)	(203)
Haverhill	MA	3	-71.0904	42.7828	196	222	260	67	124	82	124	117	133	151	171	189	(107)	(148)	(230)
Lawrence	MA	3	-71.1621	42.6996	202	221	260	67	124	83	124	117	133	145	172	188	(113)	(148)	(230)
Lowell	MA	3	-71.3269	42.6369	210	221	254	71	120	83	124	103	133	145	169	219	(121)	(148)	(210)
Lynn	MA	3	-70.9565	42.4753	192	222	242	68	120	83	124	115	124	141	173	185	(100)	(149)	(201)
Malden	MA	3	-71.0546	42.4287	200	226	244	72	120	84	124	117	124	141	173	185	(112)	(154)	(205)
Manchester	NH	3	-71.4441	42.9704	132	225	253	51	119	97	128	102	128	160	173	252	(22)	(170)	(203)
Medford	MA	3	-71.1108	42.4247	200	223	244	72	120	84	124	117	124	141	176	185	(112)	(151)	(205)
Nashua	NH	3	-71.4967	42.7528	195	228	244	68	119	99	124	102	128	160	174	220	(102)	(171)	(194)
New Bedford	MA	3	-70.928	41.6635	145	237	243	62	123	112	123	116	123	163	178	183	(50)	(192)	(202)
Newton	MA	3	-71.2136	42.3252	211	222	244	74	120	83	120	116	124	138	172	189	(125)	(145)	(204)
Pawtucket	RI	3	-71.3779	41.8773	213	223	229	83	123	90	123	94	123	142	148	181	(139)	(156)	(166)
Providence	RI	3	-71.4208	41.8169	207	223	229	77	123	91	123	94	123	143	148	182	(127)	(157)	(166)
Quincy	MA	3	-71.0154	42.259	212	222	243	78	120	91	120	115	124	138	169	186	(130)	(153)	(202)
Somerville	MA	3	-71.1037	42.3955	198	223	244	71	120	84	124	117	124	139	173	186	(109)	(151)	(205)
Taunton	MA	3	-71.0845	41.9164	208	224	243	83	123	91	123	117	123	140	171	183	(134)	(158)	(203)
Waltham	MA	3	-71.2399	42.3889	205	224	244	71	120	85	124	117	124	139	172	189	(116)	(153)	(205)
Warwick	RI	3	-71.4221	41.6987	165	222	229	72	123	87	123	94	123	142	147	181	(80)	(152)	(166)
Worcester	MA	3	-71.8078	42.2755	104	222	234	54	19	83	120	96	124	144	158	188	103	(145)	(174)
Albany	NY	5	-73.8114	42.6681	146	156	195	14	0	15	5	34	10	131	173	244	120	104	41
Schenectady	NY	5	-73.9383	42.8037	144	153	214	14	0	14	5	68	10	143	167	243	122	108	(12)
Syracuse	NY	6	-76.1393	43.0353	31	92	147	54	7	81	9	91	23	204	244	258	188	98	19
Utica	NY	6	-75.228	43.0984	60	108	143	46	3	77	4	91	21	239	251	255	171	91	25
Rochester	NY	7	-77.6179	43.1863	54	55	127	65	10	66	10	107	14	88	90	180	151	149	32
Buffalo	NY	8	-78.8761	42.8961	0	50	61	54	4	89	6	110	10	13	13	22	222	135	99
Niagara Falls	NY	8	-79.0088	43.0995	0	0	58	40	4	55	6	110	11	13	13	13	236	219	101
Allentown	PA	10	-75.4837	40.5927	150	178	207	38	14	56	18	77	27	148	177	189	78	28	(31)
Bangor	PA	10	-75.2085	40.867	116	159	211	18	0	43	18	70	27	166	172	186	146	60	(28)
Bayonne	NJ	10	-74.1054	40.6715	172	192	218	54	0	63	4	89	18	117	144	168	54	21	(45)
Bethlehem	PA	10	-75.3668	40.6253	144	179	207	37	8	58	18	80	27	149	176	190	91	25	(34)
Bridgeport	CT	10	-73.199	41.1847	160	205	223	39	0	71	0	84	20	148	164	178	81	4	(47)
Bristol	CT	10	-72.941	41.6816	131	181	242	30	15	48	20	90	30	159	173	181	104	31	(82)
Chicopee	MA	10	-72.5713	42.1711	142	159	201	35	25	51	37	77	50	150	172	187	78	33	(48)
Clifton	NJ	10	-74.1577	40.8597	174	199	220	53	0	58	4	82	13	118	152	162	53	19	(35)
Danbury	CT	10	-73.4724	41.3954	166	214	225	37	0	72	0	77	20	146	173	180	77	(6)	(42)
East Orange	NJ	10	-74.2142	40.7665	175	193	218	56	0	62	2	82	18	122	150	163	49	23	(38)
Elizabeth	NJ	10	-74.1954	40.6661	173	190	216	56	0	63	4	88	18	122	152	168	51	23	(42)
Hartford	CT	10	-72.6801	41.7657	148	171	219	44	15	56	30	89	39	166	171	176	73	23	(67)
Hempstead	NY	10	-73.6207	40.7029	178	195	218	52	0	67	2	86	11	122	149	175	50	16	(35)
Jersey City	NJ	10	-74.0687	40.7151	172	193	218	54	0	62	4	92	18	117	144	167	54	21	(48)
Meriden	CT	10	-72.8019	41.5372	124	178	226	30	0	57	20	85	30	154	171	176	126	25	(61)
Milford city (remainder)	CT	10	-73.0563	41.2226	135	189	220	38	0	49	0	84	20	153	162	178	107	42	(44)
Mount Vernon	NY	10	-73.8292	40.9123	186	207	220	54	0	61	0	81	8	120	145	171	40	12	(29)
New Britain	CT	10	-72.7871	41.6805	137	175	227	41	15	49	25	75	30	160	174	176	87	31	(52)
New Haven	CT	10	-72.9291	41.2983	138	188	229	42	0	48	0	85	25	153	159	179	100	44	(59)
New Rochelle	NY	10	-73.7739	40.9302	187	207	220	54	0	62	0	80	8	121	148	171	39	11	(28)
New York	NY	10	-73.9793	40.6974	178	189	215	54	0	59	2	86	18	116	145	168	48	30	(39)
Newark	NJ	10	-74.182	40.7316	175	193	218	54	0	62	4	86	18	121	143	167	51	21	(42)
Norwalk	CT	10	-73.4276	41.096	183	214	220	58	0	73	0	79	15	140	164	178	39	(7)	(34)
Passaic	NJ	10	-74.1266	40.8555	174	199	220	53	0	58	4	82	13	118	152	164	53	19	(35)

2005 FCC Data

Table 2 - Channel Deficit or Surplus for All Cities Over 50,000 Population

City Name	State	BEA #	City Center		Non-Nextel Site-Specific Incumbents within			Non-Nextel Site-Specific Licensees Move-in within						Nextel Site-Specific Licensed Channels within			Site-Specific Channel Deficit or Surplus within Channels 121-400		
					35 mi radius *	50 mi radius *	70 mi radius *	35 mi radius *		50 mi radius *		70 mi radius *		35 mi radius *	50 mi radius *	70 mi radius *			
			Longitude	Latitude	Chan 121-400	Chan 121-400	Chan 121-400	Chan 001-120	Chan 401-600	Chan 001-120	Chan 401-600	Chan 001-120	Chan 401-600	Chan 121-400			35 mi radius *	50 mi radius *	70 mi radius *
Paterson	NJ	10	-74.1678	40.9151	179	204	219	54	0	60	4	81	8	118	152	162	47	12	(28)
Scranton	PA	10	-75.6619	41.4045	104	144	172	0	5	8	5	33	18	162	175	230	171	123	57
Springfield	MA	10	-72.5463	42.1128	145	157	205	40	25	54	30	77	50	154	170	187	70	39	(52)
Stamford	CT	10	-73.5645	41.0927	196	216	220	53	0	72	0	78	19	123	163	178	31	(8)	(37)
Trenton	NJ	10	-74.751	40.216	161	186	211	57	14	85	14	89	18	137	148	182	48	(5)	(38)
Union City	NJ	10	-74.0303	40.7668	180	192	217	54	0	59	0	84	18	117	144	164	46	29	(39)
Waterbury	CT	10	-73.0254	41.5647	109	193	237	30	0	59	15	91	30	158	171	181	141	13	(78)
West Haven	CT	10	-72.9574	41.273	138	187	229	42	0	50	0	85	25	153	159	178	100	43	(59)
White Plains	NY	10	-73.7547	41.0259	190	207	220	51	0	62	0	80	8	122	151	172	39	11	(28)
Yonkers	NY	10	-73.8646	40.9443	187	203	218	54	0	58	4	79	8	125	145	171	39	15	(25)
Camden	NJ	12	-75.1012	39.9342	163	192	217	54	7	72	16	90	26	134	157	177	56	0	(53)
Lancaster	PA	12	-76.3001	40.0397	132	184	227	34	31	54	31	91	31	161	168	195	83	11	(69)
Philadelphia	PA	12	-75.1179	40.0018	164	193	219	55	7	74	11	90	26	133	157	179	54	2	(55)
Reading	PA	12	-75.9253	40.3337	117	188	218	27	18	59	23	80	31	151	174	194	118	10	(49)
Vineland	NJ	12	-74.9923	39.4732	161	184	222	43	8	71	15	102	29	154	163	175	68	10	(73)
Wilmington	DE	12	-75.5298	39.7299	158	173	215	47	11	62	18	91	24	140	167	188	64	27	(50)
Alexandria	VA	13	-77.09	38.8158	162	170	182	55	5	61	10	70	15	151	176	194	58	39	13
Baltimore	MD	13	-76.6205	39.2847	169	175	224	53	0	62	11	98	44	160	176	188	58	32	(86)
Bowie	MD	13	-76.7472	38.9511	158	170	195	58	5	64	5	90	26	150	178	197	59	41	(31)
Frederick	MD	13	-77.4174	39.4319	112	175	222	43	10	65	20	94	35	149	185	195	115	20	(71)
Gaithersburg	MD	13	-77.1933	39.136	157	171	202	50	5	66	15	88	32	156	171	196	68	28	(42)
Washington	DC	13	-77.0146	38.8933	161	170	191	59	5	62	10	89	20	148	178	195	55	38	(20)
Richmond	VA	15	-77.4932	37.5242	133	140	178	48	18	48	18	77	53	154	170	186	81	74	(28)
Lynchburg	VA	17	-79.1785	37.4009	97	143	172	1	0	7	33	20	38	130	145	158	182	97	50
Roanoke	VA	17	-79.9579	37.2742	100	156	193	17	0	19	0	35	2	131	138	147	163	105	50
Greensboro	NC	18	-79.8422	36.11	181	220	254	22	79	25	81	55	114	108	136	154	(2)	(46)	(143)
High Point	NC	18	-79.9879	35.9892	194	238	258	21	79	33	86	48	99	103	142	151	(14)	(77)	(125)
Winston-Salem	NC	18	-80.2485	36.1094	204	230	255	22	79	24	79	59	86	108	137	152	(25)	(53)	(120)
Cary	NC	19	-78.758	35.799	162	185	215	17	99	18	104	33	104	124	136	170	2	(27)	(72)
Durham	NC	19	-78.9109	35.9872	175	189	217	17	97	19	99	30	104	125	137	163	(9)	(27)	(71)
Raleigh	NC	19	-78.6611	35.8167	161	186	216	17	97	20	104	28	104	121	136	165	5	(30)	(68)
Rocky Mount	NC	19	-77.809	35.977	87	139	203	10	0	25	72	34	102	125	162	163	183	44	(59)
Chesapeake	VA	20	-76.2785	36.7085	181	185	197	31	0	36	0	53	3	134	143	163	68	59	27
Hampton	VA	20	-76.2925	37.023	180	188	192	32	0	35	0	46	3	142	143	162	68	57	39
Newport News	VA	20	-76.5039	37.0756	175	188	208	33	0	35	0	87	8	130	159	174	72	57	(23)
Norfolk	VA	20	-76.2397	36.9312	174	188	192	31	0	35	0	46	3	142	142	162	75	57	39
Portsmouth	VA	20	-76.3552	36.8686	177	191	192	33	0	36	0	56	3	134	143	164	70	53	29
Suffolk	VA	20	-76.6653	36.7461	172	182	209	33	0	44	3	80	18	135	154	170	75	51	(27)
Virginia Beach	VA	20	-76.0126	36.7957	159	185	192	31	0	33	0	45	0	133	142	150	90	62	43
Jacksonville	NC	21	-77.3503	34.7228	130	175	202	7	0	11	0	15	0	112	119	133	143	94	63
Fayetteville	NC	22	-78.9128	35.083	94	167	225	11	77	17	84	37	104	125	143	148	98	12	(86)
Charlotte	NC	23	-80.8286	35.2038	188	206	251	38	7	46	101	60	101	120	143	161	47	(73)	(132)
Gastonia	NC	23	-81.1785	35.2459	170	203	239	40	16	41	23	64	101	128	143	162	54	13	(124)
Columbia	SC	24	-80.9376	34.0372	140	164	205	18	0	24	7	51	17	110	129	162	122	85	7
Wilmington	NC	25	-77.9048	34.2116	117	138	219	4	0	5	0	26	5	106	118	135	159	137	30
Charleston	SC	26	-79.9819	32.8215	158	190	243	5	0	6	4	41	9	98	117	137	117	80	(13)
North Charleston	SC	26	-80.041	32.9111	157	201	236	5	4	6	4	35	12	98	117	137	114	69	(3)
Savannah	GA	28	-81.1411	32.0203	203	216	230	26	4	28	4	35	9	81	101	134	47	32	6
Gainesville	FL	29	-82.3197	29.692	126	163	218	20	16	63	21	80	63	180	188	191	118	33	(81)
Jacksonville city (remain	FL	29	-81.6831	30.3449	141	168	231	59	17	66	23	72	28	163	177	191	63	23	(51)
Daytona Beach	FL	30	-81.0967	29.2103	101	152	193	24	9	49	31	88	38	173	185	194	146	48	(39)
Lakeland	FL	30	-81.9723	28.0607	136	171	191	52	21	78	27	80	35	174	189	194	71	4	(26)
Melbourne	FL	30	-80.6473	28.1135	103	138	153	38	2	56	26	67	30	180	186	193	137	60	30
Orlando	FL	30	-81.309	28.4811	132	170	183	44	26	69	26	77	38	177	193	193	78	15	(18)
Palm Bay	FL	30	-80.6491	27.9869	100	133	163	38	2	56	21	69	30	179	188	193	140	70	18
Boca Raton	FL	31	-80.1174	26.3728	167	185	252	85	10	93	10	104	84	156	170	179	18	(8)	(160)

Table 2 - Channel Deficit or Surplus for All Cities Over 50,000 Population

City Name	State	BEA #	City Center		Non-Nextel Site-Specific Incumbents within			Non-Nextel Site-Specific Licensees Move-in within						Nextel Site-Specific Licensed Channels within			Site-Specific Channel Deficit or Surplus within Channels 121-400		
					35 mi radius *	50 mi radius *	70 mi radius *	35 mi radius *		50 mi radius *		70 mi radius *		35 mi radius *	50 mi radius *	70 mi radius *			
			Longitude	Latitude	Chan 121-400	Chan 121-400	Chan 121-400	Chan 001-120	Chan 401-600	Chan 001-120	Chan 401-600	Chan 001-120	Chan 401-600	Chan 121-400			35 mi radius *	50 mi radius *	70 mi radius *
Boynton Beach	FL	31	-80.0819	26.5281	152	183	252	83	10	94	10	104	84	155	171	179	35	(7)	(160)
Coral Springs	FL	31	-80.25	26.2657	181	250	252	90	10	102	84	105	92	161	169	181	(1)	(156)	(169)
Davie	FL	31	-80.2764	26.0761	168	250	252	75	5	100	84	103	92	158	168	180	32	(154)	(167)
Deerfield Beach	FL	31	-80.1224	26.3084	180	185	251	88	10	93	10	104	84	158	167	179	2	(8)	(159)
Delray Beach	FL	31	-80.0918	26.4562	162	183	252	83	10	94	10	104	84	156	169	179	25	(7)	(160)
Fort Lauderdale	FL	31	-80.1443	26.141	172	250	251	87	5	102	84	103	84	162	168	179	16	(156)	(158)
Hialeah	FL	31	-80.3048	25.8526	227	239	251	83	79	90	79	102	92	153	174	178	(109)	(128)	(165)
Hollywood	FL	31	-80.1755	26.0396	232	250	252	85	79	100	84	103	84	159	168	177	(116)	(154)	(159)
Lauderhill	FL	31	-80.2301	26.165	172	250	252	88	5	102	84	104	92	162	168	179	15	(156)	(168)
Margate	FL	31	-80.2119	26.2423	181	250	252	90	10	102	84	105	84	158	168	179	(1)	(156)	(161)
Miami	FL	31	-80.2296	25.7824	227	237	250	80	79	85	79	101	92	150	160	174	(106)	(121)	(163)
Miami Beach	FL	31	-80.1401	25.8101	227	237	251	81	79	88	79	102	84	150	162	174	(107)	(124)	(157)
Miramar	FL	31	-80.3231	25.9761	232	250	251	84	79	99	84	103	92	152	174	178	(115)	(153)	(166)
North Miami	FL	31	-80.1776	25.9057	227	241	251	83	79	98	79	102	84	149	169	175	(109)	(138)	(157)
Pembroke Pines	FL	31	-80.3278	26.0234	232	250	252	85	79	99	84	103	92	158	173	178	(116)	(153)	(167)
Plantation	FL	31	-80.2638	26.1267	171	250	252	85	5	102	84	104	92	163	168	180	19	(156)	(168)
Pompano Beach	FL	31	-80.1371	26.2404	181	250	251	90	10	102	84	104	84	158	168	179	(1)	(156)	(159)
Port St. Lucie	FL	31	-80.3387	27.29	96	149	176	32	5	67	5	87	9	169	182	194	147	59	8
Sunrise	FL	31	-80.2307	26.1478	172	250	252	87	5	102	84	104	92	162	168	179	16	(156)	(168)
Tamarac	FL	31	-80.271	26.2045	173	250	252	88	5	102	84	104	92	161	168	180	14	(156)	(168)
West Palm Beach	FL	31	-80.1295	26.7415	136	174	188	66	5	88	10	95	10	165	171	182	73	8	(13)
Cape Coral	FL	32	-81.9978	26.6416	126	143	168	47	15	52	21	67	23	173	185	190	92	64	22
Clearwater	FL	34	-82.7109	27.9928	118	144	165	46	0	60	4	66	5	161	179	191	116	72	44
Largo	FL	34	-82.7846	27.9077	124	134	163	43	0	54	4	64	5	161	187	190	113	88	48
St. Petersburg	FL	34	-82.6548	27.7682	123	157	172	44	0	59	2	78	9	163	188	192	113	62	21
Tampa	FL	34	-82.4683	27.9888	136	152	174	54	0	64	4	78	28	165	179	192	90	60	0
Tallahassee	FL	35	-84.2568	30.4819	143	199	235	49	25	56	30	74	41	106	124	130	63	(5)	(70)
Dothan	AL	36	-85.405	31.2425	172	202	237	32	5	40	5	92	17	99	100	130	71	33	(66)
Albany	GA	37	-84.1675	31.572	133	155	219	11	0	12	15	65	56	82	97	136	136	98	(60)
Macon	GA	38	-83.6426	32.8323	169	193	253	25	0	43	5	98	47	94	113	117	86	39	(118)
Columbus city (remainde	GA	39	-84.8741	32.491	148	155	204	25	20	26	20	63	26	105	108	118	87	79	(13)
Athens-Clarke County (r	GA	40	-83.3891	33.9443	119	167	263	24	0	56	2	101	51	108	120	127	137	55	(135)
Atlanta	GA	40	-84.4178	33.7678	207	214	232	89	47	93	49	101	56	97	111	120	(63)	(76)	(109)
Roswell	GA	40	-84.3441	34.0484	205	216	233	87	44	93	49	100	55	95	109	123	(56)	(78)	(108)
Greenville	SC	41	-82.3705	34.8334	175	219	237	7	0	14	0	39	16	88	124	153	98	47	(12)
Asheville	NC	42	-82.5219	35.5629	103	201	250	5	0	23	0	45	31	83	105	132	172	56	(46)
Chattanooga	TN	43	-85.2617	35.0835	145	181	248	23	7	27	15	56	40	92	103	125	105	57	(64)
Knoxville	TN	44	-83.9635	35.9583	166	186	249	26	20	29	20	33	20	53	74	120	68	45	(22)
Johnson City	TN	45	-82.3605	36.3471	153	205	230	26	0	36	9	40	9	74	109	128	101	30	1
Lexington-Fayette	KY	47	-84.4715	38.0283	89	127	178	3	0	5	0	25	0	192	193	201	188	148	77
Charleston	WV	48	-81.633	38.3492	111	139	180	2	6	13	11	94	11	94	113	142	161	117	(5)
Huntington	WV	48	-82.4417	38.4077	123	157	179	8	5	11	5	12	11	108	108	130	144	107	78
Cincinnati	OH	49	-84.5404	39.1364	169	187	218	30	0	39	0	53	0	115	149	191	81	54	9
Hamilton	OH	49	-84.5605	39.3884	179	190	208	33	0	39	0	52	0	122	126	181	68	51	20
Dayton	OH	50	-84.2021	39.7795	174	190	194	18	0	36	0	43	0	102	124	219	88	54	43
Kettering	OH	50	-84.1593	39.695	179	191	199	20	0	35	0	50	1	103	124	176	81	54	30
Springfield	OH	50	-83.7861	39.9371	148	192	207	10	0	34	0	48	6	108	171	220	122	54	19
Columbus	OH	51	-82.9789	39.9957	145	176	200	16	0	22	1	30	9	121	183	221	119	81	41
Pittsburgh	PA	53	-79.9805	40.4314	107	160	191	24	0	34	5	46	13	162	226	238	149	81	30
Erie	PA	54	-80.0787	42.1252	4	7	50	65	7	68	9	85	13	13	109	223	204	196	132
Akron	OH	55	-81.5131	41.0843	111	150	177	95	21	103	24	105	27	194	214	231	53	3	(29)
Canton	OH	55	-81.3667	40.8127	124	170	192	70	9	102	21	105	27	205	224	231	77	(13)	(44)
Cleveland	OH	55	-81.701	41.5012	81	107	153	97	22	101	27	105	27	164	176	227	80	45	(5)
Cuyahoga Falls	OH	55	-81.4904	41.1601	105	149	175	96	24	103	24	105	27	173	208	231	55	4	(27)
Elyria	OH	55	-82.1205	41.3773	55	107	155	69	21	100	25	104	32	163	195	228	135	48	(11)
Euclid	OH	55	-81.5207	41.5902	75	112	147	91	22	103	24	104	27	166	176	231	92	41	2

Table 2 - Channel Deficit or Surplus for All Cities Over 50,000 Population

City Name	State	BEA #	City Center		Non-Nextel Site-Specific Incumbents within			Non-Nextel Site-Specific Licensees Move-in within						Nextel Site-Specific Licensed Channels within			Site-Specific Channel Deficit or Surplus within Channels 121-400		
					35 mi radius *	50 mi radius *	70 mi radius *	35 mi radius *		50 mi radius *		70 mi radius *		35 mi radius *	50 mi radius *	70 mi radius *			
			Longitude	Latitude	Chan 121-400	Chan 121-400	Chan 121-400	Chan 001-120	Chan 401-600	Chan 001-120	Chan 401-600	Chan 001-120	Chan 401-600	Chan 121-400			35 mi radius *	50 mi radius *	70 mi radius *
Lakewood	OH	55	-81.8064	41.4816	79	108	155	95	22	101	27	104	29	168	173	222	84	44	(8)
Lorain	OH	55	-82.1955	41.4448	42	101	153	57	21	92	24	107	36	114	180	229	160	63	(16)
Mansfield	OH	55	-82.5308	40.7664	55	167	207	6	5	64	22	99	26	206	221	235	214	27	(52)
Mentor	OH	55	-81.3408	41.6985	87	100	128	80	22	101	22	104	27	165	201	235	91	57	21
Parma	OH	55	-81.7349	41.3851	84	111	157	97	22	101	27	105	27	168	199	229	77	41	(9)
Youngstown	OH	55	-80.6396	41.093	48	155	207	22	2	76	9	110	18	213	225	245	208	40	(55)
Toledo	OH	56	-83.574	41.6565	60	98	148	53	21	82	26	88	31	131	200	246	146	74	13
Ann Arbor	MI	57	-83.7372	42.2732	70	109	144	72	15	86	27	91	29	163	212	240	123	58	16
Dearborn	MI	57	-83.2136	42.3146	80	88	116	85	20	87	25	97	29	124	182	232	95	80	38
Dearborn Heights	MI	57	-83.2987	42.3126	84	88	120	86	20	87	25	93	29	126	182	231	90	80	38
Detroit	MI	57	-83.0992	42.3527	73	86	115	79	20	87	25	97	29	126	184	227	108	82	39
Farmington Hills	MI	57	-83.3771	42.4839	84	96	138	86	20	89	21	93	29	173	191	241	90	74	20
Flint	MI	57	-83.6958	43.0123	80	133	155	52	9	89	23	89	23	215	235	242	139	35	13
Lansing	MI	57	-84.5582	42.7088	59	93	187	26	3	44	4	68	14	211	245	259	192	139	11
Livonia	MI	57	-83.3731	42.3971	84	89	131	86	20	87	25	93	29	126	187	240	90	79	27
Pontiac	MI	57	-83.2911	42.6516	86	102	135	86	20	89	21	90	28	177	196	236	88	68	27
Rochester Hills	MI	57	-83.1523	42.6666	82	100	130	86	20	89	21	90	28	175	193	224	92	70	32
Royal Oak	MI	57	-83.1574	42.5074	79	93	132	86	20	86	21	97	29	128	191	227	95	80	22
Saginaw	MI	57	-83.9485	43.4246	79	117	155	20	2	49	5	89	23	208	233	242	179	109	13
Southfield	MI	57	-83.26	42.4796	84	94	136	86	20	86	20	93	29	127	191	237	90	80	22
St. Clair Shores	MI	57	-82.8919	42.4957	61	82	111	72	18	85	21	100	34	126	179	202	129	92	35
Sterling Heights	MI	57	-83.0303	42.581	76	86	113	80	20	86	21	97	26	127	191	221	104	87	44
Taylor	MI	57	-83.2685	42.2256	84	86	123	84	20	87	25	93	32	129	167	213	92	82	32
Troy	MI	57	-83.1478	42.5789	82	99	133	85	20	89	21	97	28	173	193	226	93	71	22
Warren	MI	57	-83.0266	42.4927	72	86	113	80	20	86	21	97	27	127	191	223	108	87	43
Westland	MI	57	-83.4012	42.3111	85	89	130	86	20	87	25	93	29	126	188	234	89	79	28
Green Bay	WI	59	-88.0125	44.5234	59	68	92	5	0	6	0	6	0	171	182	185	216	206	182
Appleton	WI	60	-88.4024	44.2708	69	91	115	5	0	5	0	7	0	176	183	191	206	184	158
Oshkosh	WI	60	-88.5602	44.0179	69	84	152	5	0	5	0	16	0	171	188	193	206	191	112
Bangor	MI	62	-86.1147	42.309	106	175	194	11	0	19	0	27	0	154	170	183	163	86	59
Battle Creek	MI	62	-85.2147	42.3028	97	171	206	14	1	26	1	42	3	221	242	257	168	82	29
Grand Rapids	MI	62	-85.6599	42.9565	102	145	174	4	0	14	0	22	6	153	169	242	174	121	78
Kalamazoo	MI	62	-85.597	42.2741	104	173	207	16	0	25	0	34	1	135	214	238	160	82	38
Wyoming	MI	62	-85.7089	42.8987	97	151	171	3	0	13	0	21	6	155	164	239	180	116	82
Milwaukee	WI	63	-87.9672	43.0568	114	129	159	9	0	14	0	22	0	168	188	194	157	137	99
Racine	WI	63	-87.8178	42.726	117	139	162	12	0	19	0	33	0	180	184	194	151	122	85
Sheboygan	WI	63	-87.7303	43.7444	37	115	133	0	0	12	0	15	0	168	191	194	243	153	132
Waukesha	WI	63	-88.233	43.0115	119	141	167	11	0	14	0	31	0	173	189	194	150	125	82
West Allis	WI	63	-88.0224	43.006	115	130	166	11	0	14	0	31	0	173	188	194	154	136	83
Arlington Heights	IL	64	-87.9857	42.0933	132	150	176	26	0	27	0	38	0	159	186	193	122	103	66
Aurora	IL	64	-88.301	41.7728	116	152	174	12	0	32	0	39	0	165	172	188	152	96	67
Berwyn	IL	64	-87.791	41.8432	134	146	170	23	0	30	0	36	0	154	167	187	123	104	74
Bloomington	IL	64	-88.9718	40.4782	137	230	237	10	0	25	0	35	0	122	152	167	133	25	8
Bolingbrook	IL	64	-88.1024	41.6856	132	153	168	27	0	31	0	36	0	154	168	189	121	96	76
Chicago	IL	64	-87.732	41.8337	134	146	167	23	0	30	0	35	0	154	166	187	123	104	78
Cicero	IL	64	-87.7588	41.8437	134	146	167	23	0	30	0	35	0	154	166	187	123	104	78
Des Plaines	IL	64	-87.9048	42.0375	133	139	179	25	0	27	0	40	0	159	184	193	122	114	61
Elgin	IL	64	-88.2881	42.0449	111	148	178	15	0	29	0	39	0	162	187	192	154	103	63
Evanston	IL	64	-87.699	42.0454	136	139	174	23	0	26	0	39	0	154	179	191	121	115	67
Gary	IN	64	-87.3278	41.5886	127	150	173	23	0	28	0	40	7	156	166	185	130	102	60
Hammond	IN	64	-87.5074	41.6425	139	148	159	24	0	28	0	39	0	161	161	183	117	104	82
Janesville	WI	64	-89.0148	42.6831	110	136	169	2	0	7	0	23	0	168	182	194	168	137	88
Joliet	IL	64	-88.1109	41.5251	139	154	183	27	0	31	0	38	0	156	167	185	114	95	59
Kenosha	WI	64	-87.8798	42.588	117	155	164	13	0	31	0	33	0	179	188	193	150	94	83
Mount Prospect	IL	64	-87.9321	42.0623	134	141	179	25	0	28	0	39	0	159	184	193	121	111	62
Naperville	IL	64	-88.1601	41.7481	133	156	173	24	0	31	0	35	0	164	168	189	123	93	72

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					35 mi radius *	50 mi radius *	70 mi radius *	35 mi radius *		50 mi radius *		70 mi radius *		35 mi radius *	50 mi radius *	70 mi radius *			
			Longitude	Latitude	Chan 121-400	Chan 121-400	Chan 121-400	Chan 001-120	Chan 401-600	Chan 001-120	Chan 401-600	Chan 001-120	Chan 401-600	Chan 121-400			35 mi radius *	50 mi radius *	70 mi radius *
Oak Lawn	IL	64	-87.7596	41.7127	133	149	161	26	0	31	0	37	0	154	167	185	121	100	82
Oak Park	IL	64	-87.79	41.8871	133	146	179	25	0	30	0	42	0	154	172	191	122	104	59
Palatine	IL	64	-88.049	42.1084	132	151	176	26	0	27	0	38	0	164	186	193	122	102	66
Rockford	IL	64	-89.0498	42.2587	68	123	189	3	0	6	0	24	0	156	181	193	209	151	67
Schaumburg	IL	64	-88.0574	42.0325	132	145	179	26	0	28	0	40	0	160	184	193	122	107	61
Skokie	IL	64	-87.7447	42.0341	133	139	175	24	0	27	0	39	0	154	179	191	123	114	66
Waukegan	IL	64	-87.8847	42.3708	132	159	172	23	0	31	0	35	0	177	188	193	125	90	73
Elkhart	IN	65	-85.9578	41.6882	153	186	195	17	0	26	0	35	0	126	153	214	110	68	50
South Bend	IN	65	-86.269	41.6741	115	172	195	10	0	22	0	33	0	133	158	184	155	86	52
Fort Wayne	IN	66	-85.137	41.0649	132	162	209	13	0	17	0	44	1	158	204	228	135	101	26
Anderson	IN	67	-85.6754	40.0979	177	195	205	28	0	33	0	47	0	106	130	149	75	52	28
Bloomington	IN	67	-86.532	39.1649	118	176	214	18	0	22	0	37	0	134	174	185	144	82	29
Indianapolis city (remain	IN	67	-86.1328	39.7795	158	197	204	27	0	35	7	38	7	120	149	159	95	41	31
Muncie	IN	67	-85.3949	40.1933	135	191	211	21	0	31	0	58	0	106	138	157	124	58	11
Terre Haute	IN	67	-87.3768	39.4651	110	142	192	10	0	19	0	32	7	147	156	163	160	119	49
Champaign	IL	68	-88.2713	40.1203	92	190	205	9	0	15	0	34	0	122	154	165	179	75	41
Decatur	IL	68	-88.9185	39.8571	139	229	235	10	0	25	0	31	0	115	145	162	131	26	14
Evansville	IN	69	-87.5439	37.9916	113	140	203	2	0	5	0	62	10	133	154	163	165	135	5
Owensboro	KY	69	-87.1246	37.7612	111	129	169	3	0	4	5	61	5	135	168	173	166	142	45
Louisville	KY	70	-85.72	38.2144	145	155	196	12	0	14	0	25	0	151	167	192	123	111	59
Clarksville	TN	71	-87.3481	36.5602	125	178	198	63	10	69	15	69	20	116	146	155	82	18	(7)
Murfreesboro	TN	71	-86.404	35.8532	190	191	226	22	12	22	17	74	29	105	116	118	56	50	(49)
Nashville-Davidson (rem	TN	71	-86.7852	36.1866	175	193	203	22	10	69	17	69	27	110	116	146	73	1	(19)
Jackson	TN	73	-88.8389	35.6332	55	182	226	6	100	12	108	40	122	100	110	112	119	(22)	(108)
Memphis	TN	73	-90.025	35.1294	175	233	235	35	48	51	113	57	114	109	113	116	22	(117)	(126)
Decatur	AL	74	-86.9996	34.5793	162	184	210	21	0	24	6	60	12	91	103	114	97	66	(2)
Huntsville	AL	74	-86.6943	34.7014	165	182	213	21	5	26	5	58	13	88	105	116	89	67	(4)
Jackson	MS	77	-90.1979	32.2819	152	173	198	29	0	39	5	57	16	96	96	99	99	63	9
Birmingham	AL	78	-86.8501	33.5312	171	188	214	37	6	40	6	74	9	69	84	101	66	46	(17)
Hoover	AL	78	-86.8471	33.3503	172	185	207	40	6	40	6	75	8	69	100	101	62	49	(10)
Tuscaloosa	AL	78	-87.5027	33.2972	139	178	192	5	0	41	7	43	10	77	81	109	136	54	35
Montgomery	AL	79	-86.2713	32.3436	166	171	202	37	2	40	2	62	15	83	91	111	75	67	1
Mobile	AL	80	-88.0888	30.7018	165	192	211	32	0	47	0	63	7	74	101	103	83	41	(1)
Pensacola	FL	81	-87.1929	30.4474	154	188	210	28	1	40	2	59	3	72	79	97	97	50	8
Gulfport	MS	82	-89.0687	30.4216	131	172	216	40	5	44	5	105	10	84	109	121	104	59	(51)
Kenner	LA	83	-90.2508	30.0102	175	195	215	80	0	92	10	100	11	109	120	121	25	(17)	(46)
New Orleans	LA	83	-89.8826	30.033	166	189	211	72	0	83	5	100	10	108	117	123	42	3	(41)
Baton Rouge	LA	84	-91.1115	30.4571	169	185	218	41	10	67	17	99	17	88	99	119	60	11	(54)
Lafayette	LA	85	-92.0385	30.2173	111	161	225	24	7	30	7	69	17	104	107	109	138	82	(31)
Lake Charles	LA	86	-93.1994	30.2152	151	205	236	28	0	36	0	78	0	73	97	109	101	39	(34)
Beaumont	TX	87	-94.1291	30.081	158	195	233	41	0	44	0	72	0	82	118	132	81	41	(25)
Port Arthur	TX	87	-93.9419	29.8079	165	223	232	39	0	46	0	50	5	82	96	123	76	11	(7)
Shreveport	LA	88	-93.7515	32.4796	191	218	233	31	0	35	5	58	18	83	88	119	58	22	(29)
Monroe	LA	89	-92.025	32.519	167	189	206	27	2	32	12	64	22	83	90	103	84	47	(12)
Little Rock	AR	90	-92.3253	34.7235	185	203	218	28	20	35	30	104	37	87	92	109	47	12	(79)
North Little Rock	AR	90	-92.255	34.7915	190	202	218	27	20	35	33	104	37	87	92	107	43	10	(79)
Pine Bluff	AR	90	-92.0131	34.2118	177	199	207	23	23	43	27	51	44	94	102	107	57	11	(22)
Fort Smith	AR	91	-94.3694	35.3647	105	170	199	16	15	20	18	31	18	112	118	126	144	72	32
Springfield	MO	94	-93.2993	37.1766	72	90	158	13	0	16	0	28	0	86	112	124	195	174	94
Jonesboro	AR	95	-90.6687	35.8194	92	198	266	16	24	45	59	100	78	103	111	113	148	(22)	(164)
St. Louis	MO	96	-90.2435	38.6531	190	198	218	32	0	32	5	41	5	106	128	148	58	45	16
Springfield	IL	97	-89.5878	39.7638	103	201	250	13	0	21	0	42	0	102	147	156	164	58	(12)
Columbia	MO	98	-92.3314	38.9542	75	89	104	5	0	5	0	5	0	108	112	118	200	186	171
Independence	MO	99	-94.3489	39.0788	139	162	162	13	0	17	0	18	0	144	148	149	128	101	100
Kansas City	MO	99	-94.5763	39.0922	143	160	163	17	0	18	0	19	0	140	149	193	120	102	98
Kansas City	KS	99	-94.7492	39.1227	143	160	163	18	0	18	0	19	0	141	161	193	119	102	98

Table 2 - Channel Deficit or Surplus for All Cities Over 50,000 Population

City Name	State	BEA #	City Center		Non-Nextel Site-Specific Incumbents within			Non-Nextel Site-Specific Licensees Move-in within						Nextel Site-Specific Licensed Channels within			Site-Specific Channel Deficit or Surplus within Channels 121-400		
					35 mi radius *	50 mi radius *	70 mi radius *	35 mi radius *		50 mi radius *		70 mi radius *		35 mi radius *	50 mi radius *	70 mi radius *			
			Longitude	Latitude	Chan 121-400	Chan 121-400	Chan 121-400	Chan 001-120	Chan 401-600	Chan 001-120	Chan 401-600	Chan 001-120	Chan 401-600	Chan 121-400			35 mi radius	50 mi radius	70 mi radius
Lawrence	KS	99	-95.2617	38.9748	74	146	161	5	0	15	0	19	0	193	193	193	201	119	100
Lee's Summit	MO	99	-94.3941	38.9256	144	149	163	16	0	17	0	18	0	144	147	149	120	114	99
Olathe	KS	99	-94.7987	38.8841	143	143	164	17	0	18	0	19	0	146	161	193	120	119	97
Overland Park	KS	99	-94.6753	38.9348	143	147	164	17	0	18	0	19	0	141	149	193	120	115	97
St. Joseph	MO	99	-94.8214	39.7591	61	157	169	5	0	15	0	19	0	128	161	193	214	108	92
Ames	IA	100	-93.6275	42.0183	155	189	210	4	5	4	5	9	10	122	122	142	116	82	51
Des Moines	IA	100	-93.6181	41.5797	158	168	192	3	5	3	5	4	5	112	127	142	114	104	79
Waterloo	IA	100	-92.3431	42.4963	91	155	197	0	0	9	15	12	25	101	136	162	189	101	46
Peoria	IL	101	-89.6215	40.748	135	222	257	5	0	13	0	21	0	103	146	161	140	45	2
Davenport	IA	102	-90.589	41.541	126	170	242	7	0	7	0	18	5	109	151	187	147	103	15
Cedar Rapids	IA	103	-91.6607	41.9644	124	153	211	9	5	9	10	9	10	108	136	172	142	108	50
Iowa City	IA	103	-91.5364	41.6457	133	155	221	8	5	8	5	13	10	105	152	172	134	112	36
Dubuque	IA	104	-90.6983	42.5064	82	124	214	0	0	0	5	13	15	129	174	189	198	151	38
Madison	WI	104	-89.4084	43.0894	102	115	144	3	0	3	0	5	0	153	169	188	175	162	131
Bangor	WI	105	-90.9906	43.8935	77	100	130	1	0	1	5	5	10	146	146	159	202	174	135
La Crosse	WI	105	-91.2268	43.8097	83	108	134	1	5	1	5	6	10	144	156	159	191	166	130
Rochester	MN	106	-92.4679	43.9909	85	149	250	4	10	15	10	63	42	115	116	166	181	106	(75)
Bloomington	MN	107	-93.2982	44.8243	195	211	233	60	27	62	32	63	42	108	123	123	(2)	(25)	(58)
Brooklyn Park	MN	107	-93.3405	45.1088	189	203	220	57	32	61	32	62	37	107	122	124	2	(16)	(39)
Burnsville	MN	107	-93.2757	44.7732	195	210	230	60	27	62	32	63	42	108	123	123	(2)	(24)	(55)
Coon Rapids	IA	107	-93.3198	45.1653	189	203	220	57	32	59	32	62	37	113	122	124	2	(14)	(39)
Eagan	MN	107	-93.167	44.8188	193	210	230	59	27	62	37	63	42	108	123	123	1	(29)	(55)
Eau Claire	WI	107	-91.5018	44.82	41	46	134	4	0	5	0	7	5	148	158	164	235	229	134
Eden Prairie	MN	107	-93.4598	44.8454	196	208	227	59	27	62	32	63	49	108	123	123	(2)	(22)	(59)
Maple Grove	MN	107	-93.4617	45.1085	188	200	224	56	32	62	32	62	44	113	122	124	4	(14)	(50)
Minneapolis	MN	107	-93.2614	44.9707	194	208	217	57	32	61	32	62	37	108	123	124	(3)	(21)	(36)
Minnetonka	MN	107	-93.4612	44.935	196	206	224	56	27	62	32	62	44	108	123	124	1	(20)	(50)
Plymouth	WI	107	-93.4614	45.0222	196	201	224	56	32	62	32	62	44	114	123	124	(4)	(15)	(50)
St. Paul	MN	107	-93.1061	44.9398	193	203	217	57	27	61	32	62	37	110	122	123	3	(16)	(36)
Duluth	MN	109	-92.1109	46.765	13	13	15	5	0	7	0	7	2	178	180	180	262	260	256
Fargo	ND	113	-96.8184	46.8679	46	53	93	0	21	0	26	9	67	105	105	169	213	201	111
Rapid City	SD	115	-103.238	44.0754	68	73	77	0	0	0	0	0	0	9	9	9	212	207	203
Sioux Falls	SD	116	-96.7389	43.546	84	100	140	0	0	0	5	3	10	94	110	110	196	175	127
Sioux City	IA	117	-96.3582	42.4722	66	92	155	2	0	3	10	4	10	95	97	149	212	175	111
Council Bluffs	IA	118	-95.8515	41.2327	125	152	179	12	10	20	10	21	15	123	148	155	133	98	65
Omaha	NE	118	-96.0408	41.2918	135	163	175	13	5	21	10	21	15	124	145	155	127	86	69
Lincoln	NE	119	-96.6992	40.8103	115	159	167	9	10	21	15	21	15	138	148	155	146	85	77
Wichita	KS	122	-97.3441	37.6797	94	104	117	14	0	14	0	14	0	147	152	166	172	162	149
Topeka	KS	123	-95.7008	39.0391	23	43	150	2	0	6	0	14	0	184	189	193	255	231	116
Broken Arrow	OK	124	-95.7617	36.0112	154	178	212	1	0	11	0	24	0	128	148	159	125	91	44
Tulsa	OK	124	-95.8976	36.1451	159	176	207	1	0	2	0	12	0	116	148	168	120	102	61
Edmond	OK	125	-97.4072	35.6672	107	136	184	8	0	11	0	22	0	154	160	168	165	133	74
Lawton	OK	125	-98.4254	34.5907	115	149	184	58	5	94	5	116	5	100	113	158	102	32	(25)
Midwest City	OK	125	-97.3577	35.474	104	133	185	7	0	19	0	25	0	155	162	168	169	128	70
Norman	OK	125	-97.3623	35.2469	99	129	184	7	0	18	0	25	0	158	158	176	174	133	71
Oklahoma City	OK	125	-97.4789	35.4826	106	136	185	7	0	12	0	25	0	153	158	167	167	132	70
Arlington	TX	127	-97.1355	32.6979	135	138	186	30	0	33	5	69	5	159	162	163	115	104	20
Carrollton	TX	127	-96.8986	32.9891	140	160	170	33	0	58	5	69	5	151	161	164	107	57	36
Dallas	TX	127	-96.7317	32.8212	133	153	174	27	0	58	5	69	5	156	162	165	120	64	32
Denton	TX	127	-97.1397	33.2386	157	161	192	55	5	59	5	74	5	151	155	164	63	55	9
Fort Worth	TX	127	-97.2914	32.7831	129	142	174	29	0	37	5	70	5	159	162	163	122	96	31
Garland	TX	127	-96.6049	32.9079	130	158	210	27	0	58	0	74	5	152	162	164	123	64	(9)
Grand Prairie	TX	127	-97.0024	32.6576	135	135	180	30	0	30	5	60	5	161	162	163	115	110	35
Irving	TX	127	-96.9615	32.8628	135	158	165	30	0	58	5	62	5	156	162	164	115	59	48
Killeen	TX	127	-97.7316	31.0972	110	182	206	4	0	17	15	19	15	113	126	137	166	66	40
Lewisville	TX	127	-96.973	33.043	146	159	168	33	5	58	5	62	5	151	161	164	96	58	45